

# **IMAGE APPARATUS WITH BATCH SCAN AND REAL TIME DISPLAY AND METHOD OF THE SAME**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention generally relates to an image apparatus  
and a method, and more particularly to an image apparatus with  
batch scan and real time display and a method of the same.

### **2. Description of the Prior Art**

In virtue of the prosperity of computer technology in the past  
few years, image process becomes more and more popular. Because  
of growth of science and technology, the mode of transmitting  
/receiving information has turn from simple written words into what  
is called the multimedia times. At the same time, multi-media  
signified that the delivering data contain words, images and so on. A  
variety of image processing devices has generated for different  
requirements, and image processing devices include scanner,  
photostat, fax, digital camera and other image processing system etc.

With regard to optical scanning device, it is a device for

transferring a static image into digital data. A scanner is a device that converts a visible image such as a photograph, transparent slice or printed-paper into an electronic form for processing, saving, displaying or printing by a computer. In the prior art for scanning manner of scanners, a picture is placed on a scanner window. The scanners scan the picture of utilizing image sensor from transverse axis of an original picture and shift a belt vertically to scan the picture by a step motor. The scanners scan the picture and store the resultant image in a computer memory at last. Then, the image may be displayed upon a monitor. Consequently, general scanners that scan a picture often need several seconds and ten seconds at least that the time from the scanners starting to scan to the data transmitting back scanned image to the host device.

In light of scanning manners, scanning manners of scanners are divided into reflection type and transparence type. The scanner of reflection type comprises steps of placing a cold cathode fluorescent lamp as a light source among the scanner, projecting reflective light onto opaque document such as photograph, transforming a static image into digital data by receiving reflective light through image sensor, and processing digital data by personal computer further. The scanner of transparence type comprises steps of placing a cold cathode fluorescent lamp as a light source among the scanner, projecting transmissible light onto transparent document such as

transparent slice, transforming a static image into digital data by receiving transmissible light through image sensor, and processing digital data by personal computer further.

5           In light of scanner kinds, in general the scanner divided into three types: handheld scanner, flatbed scanner and sheet-fed scanner. The first type is handheld scanner that scans by a way of manual movement, wherein the scanning scope is littler, the scanning speed is slower, and the scanning quality is inferiority of the drawbacks. A  
10 flatbed scanner has higher resolution and larger scanning scope, but the drawbacks of flatbed scanner are bulky volume and long scanning time. A sheet-fed scanner is that an ADF (automatic document feeder) installed on flatbed scanner, which scans the document rapidly by utilizing ADF. The only drawback of the scanner  
15 is that it cannot scan a whole book.

          The dpi (dots per inch) is a unit of optical resolution for scanner. If a high-resolution scan is performed of the machine, the scanning quality is better and the scanning time is longer. The digital  
20 images that derive from the scanner are displayed onto a display device by a display interface, wherein can pre-scan all pictures beforehand, save the data in memory, and then display those images sequentially. The disadvantages of this method are that the host device must have enough capacity of memory and relatively

increasing system cost. On the other hand, a method is provided for scanning one picture and displaying this picture immediately, which must wait for the scanning time. According to size and resolution of the picture, the scanning time often need several seconds and ten  
5 seconds at least that cannot display real time and merely waste time. Thus, it is imperative to develop a method and a system which reduces of the time consuming on scanning processes and thereby promotes the scanning efficiency without requiring the increase in size of a memory buffer.

Due to the above-mentioned reasons and the drawbacks that cannot convert a picture into electronic form by optical projecting device, it is imperative to develop a scanning device and a scanning method with synchronous scan and display in order to improve the  
15 drawbacks of the traditional projector. The objectives of the present invention are provided for promoting operating characteristic of the scanner, shortening the scanning time of the image and developing the efficiency of memory.

## **SUMMARY OF THE INVENTION**

It is one objective of the present invention to provide an image apparatus with batch scan and real time display and a method of the same, which simultaneously scan next picture and store in

memory in case the user changes to display. When the user desires to show the picture, the scanned image is shown and scan next picture at the same time for providing the use of next change. It is provided that the reduction of the time consuming on start preheated, stop process, and wait scan by the scanning system.

It is another object of this invention to provide an image apparatus with batch scan and real time display and a method of the same. A display frame provides a notify signal for representing to display forward image, backward image, or just scan next picture in time, and moreover user changes a switch control device to display the image that desired.

It is a further object of this invention to provide an image apparatus with batch scan and real time display and a method of the same, which can promote number and size of picture to be scanned without requiring the increase in size of a memory buffer.

It is another further object of this invention to provide an image apparatus with batch scan and real time display and a method of the same. The transmission device is mounted with the scanner, which can be positive photograph holder, negative photograph holder, or ADF (automatic document feeder). It is provided for transmitting pictures automatically into the scanner to scan continuously such

that the reduction of the manpower wasting on scanning processes.

In accordance with above-mentioned objectives of the present invention, an image apparatus with batch scan and real time display and a method of the same are provided. The method of the present invention comprises steps of utilizing a transmission device for transmitting pictures automatically into the scanner, displaying a notify signal to notice the user while the scan is finish, pre-scanning next picture and also storing in memory while the user change to display, showing the scanned image and scanning next picture at the same time for providing the use of next change. The notify signal is used for representing to display forward image, backward image, or just scan next picture, and the user change a switch control device to display the image that desired.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a schematic block diagram of an image scanning

system in accordance with one embodiment of the present invention;

FIG. 2 is an schematically structural illustration of an image scanning system in accordance with the present invention;

FIG. 3 is a flow diagram of synchronous scan and real display of an image scanning system shown in FIG.1;

FIG. 4A is a schematic illustration of notify signals in an image display frame, a rightward arrow means that the next scanning image is unfinished, and a leftward arrow means that the previous scanning image is unfinished; and

FIG. 4B is a schematic illustration of notify signals in an image display frame, a rightward arrow means that the next scanning image is finished, and a leftward arrow means that the previous scanning image is finished.

## **DESCRIPTION OF THE PREFERRED EMBODIMENT**

Some sample embodiments of the invention will now be described in greater detail. Nevertheless, it should be noted that the present invention can be practiced in a wide range of other embodiments besides those explicitly described, and the scope of the

present invention is expressly not limited except as specified in the accompanying claims.

Referring to FIG. 1, in one embodiment of the invention, a  
5 schematic block diagram of an image scanning system 10 is shown.  
The image scanning system 10 comprises a scanner 12, memory 14,  
transmission device 16, switch control device 18 and signal control  
device 24. The scanner 12 is a device for transferring a plane picture  
into a digital form. The memory 14 is used for storing the digital  
10 information of the scanner 12. A ring buffer can be used as the  
memory 14. A ping-pong buffer can also be used as the memory 14.  
The scanner 12 mounts the transmission device 16 that used as  
carrying inactive pictures. The transmission device 16 is provided for  
transmitting pictures automatically into the scanner to going on  
15 scanning. The switch control device 18 is coupled to the scanner 12,  
and furthermore the switch control device 18 is a switch to change  
the present image into next image or forward image. The signal  
control device 24 is comprised of an application specific integrated  
circuit (ASIC) that processes the switch signal and notices the  
20 transmission device 16 carrying the next picture into the scanner 12  
to scan synchronously.

Then, the digital image from the image scanning system 10 is  
transmitted onto a display device 22 by a display interface 20. The



digital image derives from the image scanning system 10 is transmitted by a display interface 20 and displayed onto a display device22.

5 Referring to FIG. 2, and FIG. 2 is an schematically structural illustration of an image scanning system in accordance with the present invention. In accordance with the present invention, an image apparatus with batch scan and real time display and a method of the same are provided. The user adjusts the switch control device 18 to  
10 change an image that desires to display, and simultaneously drives the transmission device 16 for transmitting the next picture into the scanner to going on scanning. The image frame has a display switch 30 thereon which notify signals could represent to go forward, go backward, or just scan the next picture in time. The signal control  
15 device 24 is provided for the functions that process the switch signal and notice the transmission device 16 carrying the next picture into the scanner 12 to scan synchronously. With regard to the conventional scanners, the scanning time is about 7.68 seconds that the designated area of 1024\*768 dpi by the scanning line about 10  
20 milli-seconds. It is in need of more scanning time for scanning the designated area in higher resolution. Consequently, as the users change the present image into the next image, the users scan the next image and store the digital information into the memory 14 by an image data signal 32 in advance. When the users change to

display the next image, the scanned image in the memory 14 is displayed by an index signal 34.

The memory 14 is a special kind of the memory buffer that used for storing the digital information of the scanner 12. A ring buffer and a ping-pong buffer can be used as the memory 14 shown in this invention. Suppose that the memory buffer shown in FIG. 2 has a memory buffer block 14-1, a memory buffer block 14-2, a memory buffer block 14-3 and a memory buffer block 14-4, etc. The first digital information is stored in the memory buffer block 14-1, and the second digital information is stored in the memory buffer block 14-2. Then storing in the follow-up memory buffer block in sequence until the memory buffer is filled with the digital information. The next digital information is stored in the memory buffer block 14-1 and covered over the prior information. It is a characteristic of the ring buffer, which storing mode is to be moved in circles. The ping-pong buffer is a kind of the ring buffer. The ping-pong buffer merely has two memory buffer blocks for storing the digital information in circulating mode. Therefore the number and size of the images allocate the capacity of the memory buffer. In response to the digital information of controlling by the image data signal 32 and the index signal 34, the digital information corresponding to the index of an image display signal 36 is displayed. Thereafter the digital data is transmitted onto a display device 22 by a display interface 20, in

which the display device 22 can be a television, monitor, liquid crystal display or projector.

Referring to FIG. 3, and a detailed functional flow diagram of an image scanning system in accordance with the embodiments of the present invention is illustrated. The method of the invention starts from the step of 40, and the transmission device 16 transfers first picture into the scanner in the step of 42 firstly. In the step of 44, the picture is proceeded to scan, and moreover a notify signal on a display device is used to notice the user the present situation of scan in the step of 46. If scanning the picture is finished, the step of 48 is proceeding to go next step. Otherwise jump to the preceding step until scan is finished. Next step of 50, the index signal points at first image, and first image is displayed on the display device. Simultaneously, the step notices the transmission device 16 transmitting second picture into the scanner to scan. There was going on next step until scanning of the image is finished. The step of 54 waits the user to change the image. If the switch control device 18 is not turn on, the index signal points to display original image in the step of 58. If the switch control device 18 is turn on, the index signal points to display next image. Synchronously, the transmission device 16 is provided for transmitting next picture into the scanner and scanning the next picture in the step of 56. In next step of 60, there is a notify signal in the display device, which means that the picture

is scanning right now. In the step of 62, the notify signal changes until scanning the picture is finished and jumps back to wait next change for showing next image. If a scanning action is not finished, proceeded to scan until that is finished. If the user changes to display next image right now, the image will be displayed until scanning is end.

Furthermore referring to FIG. 4A and FIG. 4B, and FIG. 4A and FIG.4B are schematic illustrations of notify signals in a display frame, wherein notify signals in the display frame can be distinguished from the sign of arrow image, twinkle image or unlike color image. The notify signals indicate that the condition of display and scan at present to supplying reference for users. The arrow sign is represented herein. A rightward arrow 30-1 means that the next image is in the act of scanning. There is no image to display until the scanning is finished. A leftward arrow 30-2 means that there is no previous image to display at present. A rightward arrow 30-3 means that the scanning of the next image is finished and a display switch 30 therein can represent to display the image. A leftward arrow 30-4 means that the scanned image previously can display by a display switch.

Although specific embodiments have been illustrated and described, it will be obvious to those skilled in the art that various

modifications may be made without departing from what is intended to be limited solely by the appended claims.

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